WHAT IS CLAIMED IS:

1.   A method of increasing an amount of memory in a queuing area
on demand in a storage system implementing a remote mirroring function,
said storage system including first and second storage subsystems which are
5   connected to each other via a path and the first storage subsystem being
connected to a host, the method comprising the steps of:

providing a primary volume to the first storage subsystem and a remote
secondary volume to the second storage subsystem, the remote secondary
volume being a copied volume of the primary volume, the primary volume and
10   the remote secondary volume being operated in the asynchronous mode;

providing memory in a queuing area of the second storage subsystem
for temporarily storing data transferred to the second storage subsystem from
the first storage subsystem in response to a write input/output (I/O) issued by
the host to write data in the primary volume;

15   retrieving data temporarily stored in the memory and storing the data in
the remote secondary volume; and

monitoring an unused area of the queuing area and increasing an
amount of the memory therein when the unused area becomes less than a
predetermined amount.

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2.   The method according to claim 1, wherein said increasing an
amount of the memory in the queuing area includes automatically provisioning
more memory to the queuing area.

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3. The method according to claim 2, wherein said automatically provisioning more memory includes adding memory units to said queuing area.

5 4. The method according to claim 3, wherein said memory units each includes at least one of cache memory and a disk drive.

5. The method according to claim 1, wherein said monitoring is performed by a resource/license management unit which monitors information

10 collected with respect to the unused area of the memory forming the queuing area.

6. The method according to claim 5, wherein said queuing area is formed by cache memory having at least one memory device and at least one

15 disk drive.

7. The method according to claim 6, wherein said information collected with respect to the unused area of the memory forming the queuing area includes information regarding the amount of use of the capacity of said

20 cache memory and information regarding the amount of use of the capacity of said at least one disk drive.

8. The method according to claim 7, wherein increasing an amount of the memory forming the queuing area includes adding a memory device to

said cache memory and/or adding another disk drive to said at least one disk drive.

9.   The method according to claim 7, wherein said information regarding the amount of use of the capacity of said cache memory is provided by a cache management table having a plurality of entries each including at least a slot number field which indicates a number identifying a memory device included in the cache memory, an installation status field which indicates whether the memory device has been installed, a license key status field which indicates whether a license for the memory device has been installed and a size field which indicates the capacity of the memory device and said resource/license management unit monitors said cache management table.

10.   The method according to claim 7, wherein said information regarding the amount of use of the capacity of said at least one disk drive is provided by a disk management table having a plurality of entries each including at least a device number field which indicates a number identifying a disk drive included in the at least one disk drive, an installation status field which indicates whether the disk drive has been installed, a license key status field which indicates whether a license for the disk drive has been installed and a size field which indicates the capacity of the disk drive and said resource/license management unit monitors said disk management table.

11.   The method according to claim 1, wherein said increasing an amount of the memory in the queuing area includes notifying a management center system when the unused area becomes less than a predetermined amount, and

5   wherein said management center system causes the amount of the memory of the queuing area to be increased.

12.   The method according to claim 11, wherein said management center system causes the amount of the memory of the queuing area to be

10   increased by notifying the user or a service person that memory is to be added to the queuing area.

13.   The method according to claim 12, wherein said management center system includes a repository of collected information including, for

15   example, customer definition and location information regarding the features and location of the customer's storage subsystems for use by the user or a service person to add memory to the queuing area.

14.   A storage system comprising:

20   a first storage apparatus which is connected to a host and includes a primary volume; and

        a second storage apparatus which is connected to said first storage apparatus via a path and includes a remote secondary volume and a queuing area having memory for temporarily storing data transferred to the second

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storage subsystem from the first storage subsystem in response to a write

input/output (I/O) issued by the host to write data in the primary volume,

wherein the remote secondary volume is a copied volume of the

primary volume and the primary volume and the remote secondary volume

5   are in asynchronous mode,

wherein an unused area of the queuing area is monitored and an

amount of the memory therein is increased when the unused area becomes

less than a predetermined amount.

10   15.   The storage system according to claim 14, wherein increasing

an amount of the memory in the queuing area includes automatically

provisioning more memory to the queuing area. .

         16.   The storage system according to claim 15, wherein said

15   automatically provisioning more memory includes adding memory units to

said queuing area.

         17.   The storage system according to claim 16, wherein said

memory units each includes at least one of cache memory and a disk drive.

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         18.   The storage system according to claim 14, wherein monitoring is

performed by a resource/license management unit which monitors information

collected with respect to the unused area of the memory forming the queuing

area.

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19.   The storage system according to claim 18, wherein said queuing

area is formed by cache memory having at least one memory device and at

least one disk drive.

5   20.   The storage system according to claim 19, wherein said

information collected with respect to the unused area of the memory forming

the queuing area includes information regarding the amount of use of the

capacity of said cache memory and information regarding the amount of use

of the capacity of said at least one disk drive.

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21.   The storage system according to claim 20, wherein increasing

an amount of the memory forming the queuing area includes adding a

memory device to said cache memory and/or adding another disk drive to

said at least one disk drive.

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22.   The storage system according to claim 20, wherein said

information regarding the amount of use of the capacity of said cache memory

is provided by a cache management table having a plurality of entries each

including at least a slot number field which indicates a number identifying a

20   memory device included in the cache memory, an installation status field

which indicates whether the memory device has been installed, a license key

status field which indicates whether a license for the memory device has been

installed and a size field which indicates the capacity of the memory device

and said resource/license management unit monitors said cache

25   management table.

23.   The storage system according to claim 20, wherein said information regarding the amount of use of the capacity of said at least one disk drive is provided by a disk management table having a plurality of entries

5   each including at least a device number field which indicates a number identifying a disk drive included in the at least one disk drive, an installation status field which indicates whether the disk drive has been installed, a license key status field which indicates whether a license for the disk drive has been installed and a size field which indicates the capacity of the disk

10   drive and said resource/license management unit monitors said disk management table.

24.   The storage system according to claim 14, wherein increasing an amount of the memory in the queuing area includes notifying a

15   management center system when the unused area becomes less than a predetermined amount, and

        wherein said management center system causes the amount of the memory of the queuing area to be increased.

20   25.   The storage system according to claim 24, wherein said management center system causes the amount of the memory of the queuing area to be increased by notifying the user or a service person that memory is to be added to the queuing area.

26.   The storage system according to claim 25, wherein said

management center system includes a repository of collected information

including, for example, customer definition and location information regarding

the features and location of the customer's storage subsystems for use by the

5   user or a service person to add memory to the queuing area.